

and almost a natural consequence, that the quantity which passes is the *equivalent* of, and therefore equal to, that of the particles separated; *i.e.* that if the electrical power which holds the elements of a grain of water in combination, or which makes a grain of oxygen-and hydrogen in the 'right proportions unite into water when they are made to combine, could be thrown into the condition of a *current*, it would exactly equal the current required for the separation of that grain of water into its elements again.

591. This view of the subject gives an almost overwhelming idea of the extraordinary quantity or degree of electric power which naturally belongs to the particles of matter; but it is not inconsistent in the slightest degree with the facts which can be brought to bear on this point. To illustrate this I must say a few words on the voltaic pile.¹

592. Intending hereafter to apply the results given in this and the preceding series of Researches to a close investigation of the source of electricity in the voltaic instrument, I have refrained from forming any decided opinion on the subject; and without at all meaning to dismiss metallic contact, or the contact of dissimilar substances, being conductors, but not metallic, as if they had nothing to do with the origin of the current, I still am fully of opinion with Davy, that it is at least continued by chemical action, and that the supply constituting the current is almost entirely from that source.

593. Those bodies which, being interposed between the metals of the voltaic pile, render it active, *are all of them electrolytes* (212); and it cannot but press upon the attention of every one engaged in considering this subject, that in those bodies (so essential to the pile) decomposition and the transmission of a current are so intimately connected, that one cannot happen without the other. This I have shown abundantly in water, and numerous other cases (138, 212). If, then, a voltaic trough have its extremities connected by a body capable of being decomposed, as water, we shall have a continuous current through the apparatus; and whilst it remains in this state we may look at the part where the acid is acting upon the plates, and that where the current is acting upon the water, as

¹ By the term voltaic pile, I mean such apparatus or arrangement of metals as up to this time have been called so, and which contain brine, acids, or other aqueous solutions or decomposable substances (212). between their plates. Other kinds of electric apparatus may be hereafter invented, and I hope to construct some not belonging to the class of instruments discovered by Volta.